Research Article (Araştırma Makalesi)

Knowledge and Attitudes of Nurses Working in a Public Hospital Regarding Nosocomial Infections and Their Prevention

Bir Devlet Hastanesinde Çalışan Hemşirelerin Hastane Enfeksiyonları ve Önlenmesine Yönelik Bilgi ve Tutumları

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Özet

Amaç: Bu çalışmanın amacı; bir devlet hastanesinde çalışan hemşirelerin hastane enfeksiyonları ve önlenmesine yönelik bilgi ve tutumlarını saptamaktır.

Gereç ve Yöntemler: Kesitsel tipte olan bu çalışma, Haziran 2020–Ağustos 2020 tarihleri arasında yapılmış olup; Doğu Anadolu bölgesindeki bir ilin merkezinde hasta bakımında en büyük paya sahip olan ve hasta ile birebir teması bulunan bir devlet hastanesinde çalışan tüm hemşireleri kapsamıştır. Hastanede toplamda 260 hemşire bulunmaktadır. Araştırmada örneklem seçimine gidilmemiş araştırmaya 225 hemşire katılmıştır (Cevaplılık oranı: %86.5). Veri toplama aracı olarak araştırmacılar tarafından literatür doğrultusunda hazırlanan anket formu kullanılmıştır.

Bulgular: Katılımcıların %64.4'ü kadrolu olup, %63.6'sı kadındır. Katılımcının çalışma şekli ve eğitim düzeyi değişkenlerinin her biri birbirinden bağımsız olacak şekilde hastane enfeksiyonlarından korunmayı bilip bilmeme üzerinde etkili bulunmuştur ($p<0.05$).

Sonuç: Mevcut araştırma ile enfeksiyona sebep olacak bazı uygulamaların yeterli düzeyde olmadığı saptanmıştır.

Anahtar kelimeler: Bilgi, Hastane, Hastane enfeksiyonu, Hemşire

Abstract

Objective: The goal of present study is to determine the knowledge and attitudes of nurses working in a public hospital regarding nosocomial infections and their prevention.

Material and Methods: This cross-sectional study design was conducted between June 2020 and August 2020 and included all the nurses working for a public hospital having the greatest share in patient care and contacting the patients personally in the city center of a province located in East Anatolian Region. A total of 260 nurses were working in the hospital. The sample selection was not used in the study and 225 nurses participated in the study (Response rate: 86.5%). A questionnaire prepared by the researchers in accordance with the literature was used as the data collection tool.

Results: It was found that 64.4% of the participants were staff and 63.6% was female. Each of the variables of type of work and education level was independently found to be effective on if or not they knew how to protect from nosocomial infections; respectively in terms of the impact coefficients ($p<0.05$).

Conclusion: The present study revealed that some practices that may lead to infection were not at sufficient level.

Keywords: Hospital, Knowledge, Nosocomial infection, Nurse

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INTRODUCTION

Nosocomial infections refer to infections that are not in incubation period during the admission and are acquired in the hospital. Nosocomial infections develop in 48-72 hours after patient is hospitalized and within the first 10 days following the discharge (1). The causes of nosocomial infections include invasive procedures performed in the hospital, failure to pay attention to hygiene rules, insufficient number of healthcare personnel, and factors negatively influencing immune system of the patient (2). Factors of nosocomial infections are the resistant microorganisms found in the flora of hospital. Therefore, nosocomial infectionsare hard to treat and require long term treatment with broad spectrum and expensive antibiotics. They lead to prolongation of hospitalization duration and increase of costs (3). It is possible to briefly summarize why nosocomial infections are important in four items:

Nosocomial infections lead to prolonged hospitalization duration.

Mortality rate of the patients developing nosocomial infections is greater compared to the patients without infection.

Nosocomial infections lead to a considerable increase in cost of treatment(4).

Various studies have reported that approximately 3-14% of the patients applying to hospital has developed nosocomial infection. In USA, nosocomial infections have been reported to be a major cause of morbidity and mortality influencing more than 2 million of patients every year. According to the data of World Health Organization, nosocomial infections occur one out of 10 patients receiving inpatient treatments in hospital. This problem is even greater in developing countries due to poor hygienic conditions, and lack of sufficient attention to the nosocomial infections and infection control (5).

Infections acquired from the own settings of the hospitals that are responsible forregaining health, maintaining existing health, and providing the treatment, care, and rehabilitation needed incase of disease negatively affect the quality of care and lead to material and moral damage. As the statistical data are evaluated, education level, knowledge and attitude of the nurses creating a great part percentage of the healthcare personnel are critical. Starting from this point of view, the goal of present study is to determine the knowledge and attitudes of nurses workingin a public hospital regarding nosocomial infections and their prevention.

MATERIALS AND METHODS

Thiscross-sectional study with quantitativeresearch design was conducted between June 2020 and August 2020 and included all the nurses working for a public hospital having the greatest share in patient care and contacting the patients personally in the city center of a province located in East Anatolian Region. A total of 260 nurses were working in the hospital. The sample selection was not used in the studyand 225 nurses participated in the study (Response rate: 86.5%). Nurses who were on maternity leave, on sick leave, on unpaid leave, and not willing to participate in the questionnaire were excluded from the study group.

A questionnaire prepared by the researchers in accordance with the literature was used as the data collection tool.The questionnaire involves questions (29) determining the participants' socio-demographic characteristics, occupational characteristics, information sources regarding nosocomial infections and their prevention, knowledge about nosocomial infections and knowledge and attitudes regarding other knowledge about nosocomial infections.

Statistical Analysis

For the analysis,Statistical Package for the Social Sciences-22 (SPSS-22) program was used. Descriptive data were stated in percentage, chi-square and logistic regression analysis tests were performed,and $p < 0.05$ was accepted as statistical significance level.

RESULTS

It was found that 64.4% of the participants were staff and 63.6% was female. **Table 1** shows socio-demographic characteristics of the participants.

Table 1. Socio-demographic characteristics of the participants (n=225)

Characteristics		Number	%
Age range	20 years and younger	5	2.2
	21-25 years of age	83	36.9
	26-30 years of age	65	28.9
	31-35 years of age	38	16.9
	36-40 years of age	19	8.4
	41-45 years of age	13	5.8
	46 and older	2	0.9
Gender	Female	143	63.6
	Male	83	36.4
Position of work	Staff	145	64.5
	Contracted	59	26.2
	Other	21	9.3

Marital Status	Married Single Other	119 103 3	52.9 45.8 1.3
Education level	High School Associate degree Bachelor's degree Postgraduate and higher	46 38 129 12	20.5 16.9 57.3 5.3
Period of service	Less than 1 year 1-5 years 6-10 years 11-15 years 16-20 years 21 years and longer	23 89 59 31 10 13	10.2 39.6 26.2 13.8 4.4 5.8
Type of work	Full Time, Day Shift Full Time Night Continuous shift Other	105 66 6 35 13	46.6 29.3 2.7 15.6 5.8

Table 2 shows knowledge, attitude, and behaviors of the participants regarding nosocomial infections. The rate of those who stated to receive information about nosocomial infections was 94.2%. 68.22% of them indicated their information source as school education, 17.3% digital information sources, 17.3% visual communication resources, and 12.6% written communication tools. 84.4% of the participants reported that they attended a conference/seminar/conversation about nosocomial infections, 86.2% considered that the measurements taken by their institution were sufficient, and 36.4% thought that these measurements were protecting them. Of the participants, 87.6% noted that catheters inserted for intravenous (IV) treatment need to be removed for 1-3 hours at the latest, and the rest indicated it requires 4 hours and longer time of period.The rate of those stating that the sterility of a sterilized package is 1-3 hours maximum was 61.8% and the rest said that it requires 4 hours and longer. 88.4% of the participants stated that the use of enclosed drainage sets such as bladder and chest tube played an intermediatory role for the transmission of nosocomial infections. Of the participants, 88.4% indicated that HBV vaccine was important for prevention of nosocomial infections and the rest stated it was not important.

Table 2.Knowledge, attitude, and behaviors of the participants regarding nosocomial infections (n=225)

Characteristics		**Number**	**%**
Receiving information about nosocomial infections	Yes No	212 13	94.2 5.8
Has their institution provided education about nosocomial infections?	Yes No	190 35	84.4 15.6
Thinking that measurements taken by the hospital are sufficient	Yes No	194 35	86.2 13.8
Does gloves a must for every contact with the patients?	Yes No	200 25	88.9 11.1
Is it mandatory to use disinfectant/wash hands after evert contact with the patients?	Yes No	205 20	91.1 8.9
Do you think if you have sufficient knowledge about nosocomial infections?	Yes No	141 84	62.7 37.3
Do you think if you have sufficient knowledge about the methods of protection from infectious disease?	Yes No	134 91	59.6 40.4
Do you think activities such as obtaining information andreceiving education about the methods of protection from nosocomial infections are essential?	Yes No	198 27	88.0 12.0
What is the most effective protection method to about from nosocomial infections?	Washing hands Use of disinfectant Use of PPE Sterilization of material	68 13 126 18	30.2 5.8 56.0 8.0
Which one is the most important stage of protection from nosocomial infections?	Primary protection Secondary protection Tertiary protection	204 12 9	90.7 5.3 4.0
Is it important to take control of using antibiotics for nosocomial infections?	Yes No	174 51	77.3 22.7
Is isolation important for prevention of nosocomial infections?	Yes No	219 6	97.3 2.7

PPE: Personal Protective Equipment (gloves, mask, gown)

Chi-square analysis was carried out for the distribution of the participants' perceptions of the stage of protection from nosocomial infections based on sociodemographic characteristics, cases with statistical difference were presented on the **Table 3**. The variables of gender, age range, duration of service at the profession, and type of work were determined not to create a difference (p>0.05). It was found that those who were staff personnel, had a bachelor's degree, and received training about the issue considered primary protection stage more important (p<0.05). **Table 4** shows socio-demographic characteristics affecting knowledge of the participants about protection form nosocomial infections.

As seen in **Table 4**, each of the variables of type of work and education level was independently found to be effective on if or not they knew how to protect from nosocomial infections; respectively in terms of the impact coefficients (p<0.05). At a one unity of increase level, it was found that working at other status was effective 0.19 times and having a bachelor's degree was effective 80.411 times in case of lack of knowing how to protect from nosocomial infections(p<0.05).

DISCUSSION

The present study,conducted in order to identify knowledge and attitudes of nurses working in a public hospital regarding nosocomial infections and their prevention,included all the nurses working in a public hospital with the greatest share in patient care and contacting the patients personally.64.4% of the participants were staff and 63.6% were female.

Distribution of the factors for nosocomial infections may vary between countries, hospitals, even in the same unit (6). Microorganisms endemically found in the hospital, variation in antibiotic susceptibility of these microorganisms, and increased use of invasive tools

Table 3. Distribution of the participants' perceptions of the stage of protection from nosocomial infections in terms of sociodemographic characteristics

Characteristics		**The perception of protection from nosocomial infections**			**Test and p value**
Primary protectionn (%)		**Secondary protectionn (%)**		**Tertiary protection n (%)**	
Position of work	Staff	138 (95.2)	5 (3.4)	2 (1.4)	χ^2=12.971
	Contracted	50 (84.7)	5 (8.5)	4 (6.8)	**p=0.011**
	Other	16 (76.2)	2 (9.5)	3 (14.3)	
Education level	High School	37 (80.4)	6 (13.0)	3 (6.5)	χ^2=14.825
	Associate degree	36 (94.7)	1 (2.6)	1 (2.6)	**p=0.022**
	Bachelor's degree	122 (94.6)	4 (3.1)	3 (2.3)	
	Postgraduate and higher	9 (75.0)	1 (8.3)	2 (16.7)	
Receiving training previously	Yes	194 (91.5)	12 (5.7)	6 (2.8)	χ^2=13.576
	No	10 (76.9)	2 (0.0)	3 (23.1)	**p=0.001**

Table 4.Characteristics affecting knowledge of the participants about protection form nosocomial infection0s

Variable		**β**	**p**	**OR**	**%95 GA**
Position of work	Staff			1.00	
	Contracted	-0.083	0.806	0.921	0.476-1.780
	Other	-1.662	**0.003**	0.190	0.064-0.567
Gender	Female			1.00	
	Male	0.087	0.784	1.091	0.587-2.0025
Education level	High School			1.00	
	Associate degree	-0.156	0.752	0.855	0.324-2.259
	Bachelor' s degree	-0.818	**0.033**	0.441	0.209-0.934
	Postgraduate and higher	0.765	0.378	2.149	0.392-11.769
Type of work	Full Time, Day			1.00	
	Shift	0.053	0.879	1.055	0.529-2.104
	Full Time Night	0.334	0.714	1.397	0.234-8.321
	Continuous shift	0.076	0.861	1.079	0.462-2.519
	Other	0.587	0.394	1.798	0.466-6.933

are among the important factors of these changes. The factors leading to hospital infectionsvary based on type of the catheter used, insertion area of the catheter, condition of the host, and the hospital and unit where the patient is hospitalized (7). Characteristics and infection likelihood of the catheters used in hospitals are known to prevent intravascular catheter infections (8). Accordingly, 87.6% of the participants, noted that catheters inserted for IV treatment need to be removed in 1-3 hours at the latest, the rest indicated that it requires 4 hours and longer time of period. Infusion of blood and blood products needs to be completed within four hours. In the study by Mankan 89.9% of the nurses answered correctly and 7.7% was wrong. Results of the present study are compatible to those of Mankan (9).

The most prevalent nosocomial infections are urinary tract infections, surgical wound infection, respiratory system (pneumonia) and bloodstream infections (1). 88.4% of the participants stated that the use of enclosed drainage sets such as bladder, and chest tube played an intermediatory role for the transmission of nosocomial infections. Urinary tract infections are the most prevalent among the nosocomial infections (10,11) and responsible for 40-60% of the acquired infections (12). Bakır (12) reported that urinary catherization had the greatest effect on the occurrence of urinary tract infections. On the other hand, hospital acquired pneumonia is ranked as the second or third among the nosocomial infections and as the first among the nosocomial infections leading to death in both developed and developing countries (13,14). Especially, the most prevalent nosocomial infections of intensive care unit are pneumonia, urinary tract infections and bloodstream infections (15,16).

Vaccination is reported to be important for prevention of nosocomial infections. Vaccination is particularly crucial for protection from nosocomial infections induced by Hepatitis B (17). Of the participants, 88.4% indicated that HBV vaccination was important for prevention of nosocomial infections and the rest stated that it was not important. In the study by Aytaç et al., (2), nurses stated that Hepatitis B vaccine was important for prevention of nosocomial infection and 91% stated that isolation was required for prevention of nosocomial infections. In the study by Demir (18) a great majority of nurses (91.1%) stated that vaccination was important for prevention of nosocomial infections. 90.5% of nurses in study by Naharcı (1) and 67.1% of those in the study by Diker (19) noted that they believed the necessity of vaccination against Hepatitis B infection. The results of the present study are compatible with the literature.

The rate of those who stated to receive information about nosocomial infections was 94.2%. 68.22% statedinformation source as school education, 17.3% as digital information resources, 17.3% as visual communication resources, and 12.6% as written communication tools. In addition, 84.4% of the participants attended a conference/seminar/conversation about nosocomial infections. The rate of those receiving education was 63.3% in the study by Naharcı (1), 63.3% of the nurses received education regarding nosocomial infections in the study by Aytaç et al., (2), 72% of the nurses in the study by Günay did not participate in any education program about nosocomial infections (20). While Altıok et al., suggested the organization of continuous in-service training programs by evaluating training needs of healthcare personnel in certain intervals through questionnaire and observation (21), Bayındır recommended to train all hospital staff about nosocomial infections and to ensure maintenance of training (22). As indicated in the studies, in-service training is important for prevention of nosocomial infections and it needs to increase participation of all nurses to in-service training and to ensure their participation by planning qualified and regular trainings.

As the distribution of participants' perceptions of the stage of protection from nosocomial infections in terms of sociodemographic characteristics was analyzed, it was determined that the variables of gender, age range, duration of service at the profession, and type of work did not create a difference ($p>0.05$). In study by İnfal, the score of male nurses (41.24) was higher than the score of female nurses and the difference between two groups was statistically significant (23). In another study by İnfal, the score (42.38) of nurses in age group of 25 years and older was higher than the score (36.97) of nurses in age group of 24 years and less and this was statistically significant (23).

Those working as staff personnel, having a bachelor's degree, and receiving relevant training were determined to state that they considered primary protection stage more significant ($p<0.05$). In their study, Aytaç et al., determined that knowledge score of the nurses increased as their education level increased (2).

Knowledge of nurses about nosocomial infections clearly suggested that lack of information can be avoi-

ded. Some socio-demographic characteristics of nurses influence their level of knowledge about the issue. The present studyrevealed that some practices that may lead to infection were not at sufficient level. The study is considerably important in terms of determination of knowledge levels of nurses, serving in East Anatolia Region of Turkey, about nosocomial infections. However, it is not enough to measure only knowledge level of nurses to prevent nosocomial infections. In the light of these results, it is thought that it would be beneficial;

To investigate the knowledge levels of other personnel, besides nurses, about the relevant issue

To carry out inclusive studies by increasing the size of sample to global level,

To provide healthcare personnel with training in regular periods about infections and methods of protection regarding healthcare service,

To update trainings and also to evaluate the trainings with the tests before and after the training.

Ethics Committee Approval: This study was approved by Bingol University Ethics Committee (Approval number: 2019-09, Date: 12.02.2019).

Informed Consent: Written informed consents were obtained from all participants.

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REFERENCES

1. Naharcı H. Determination of the knowledge about effective measures in preventing nozocomial infections of nurses working in intensive care units of various hospitals in Adana. Master's Thesis. 2006.
2. Aytaç N, Naharcı H, Öztunç G. Knowledge about nozocomial infections of nurses working in intensive care in training andresearch hospitals in Adana. Adnan Menderes University Faculty of Medicine Journal. 2008;9(3):9-15.
3. Engin A, Kurukahvecioğlu O. Skin antisepsis in surgery. Turkish Journal of Hospital Infections. 1998;2:131-142.
4. Parlar S, Ovayolu N, Bozkurt Aİ. Knowledge, attitude and practices of nurses working in intensive care units on hand hygiene, wearing gloves and using antiseptics. Nursing Forum. 2003;6(4):60-68.
5. Özçetin M, Ulaş Saz E, Karapınar B, Özen S, Aydemir Ş, Vardar F. Pediatric nosocomial infections; incidence, risk factors. J Pediatr Inf.2009;3:49-53.
6. Vincet J. Ventilator-associated pneumonia. Journal of Hospital Infection.2004;57:272-280.
7. Yüce A, Çakır N (Eds). Hospital Infections. 2nd Edition, Güven BookstoreLtd. Comp. İzmir. 2009:3-51.
8. Aygün G. Prevention and control of intravascular catheter infections. Istanbul University Cerrahpaşa Medical Faculty Patient Infections Prevention and Control Symposium, January 2008, No:60:79-88.
9. Mankan T. The Knowledge level of nurses related to prevention of hospital infections. Atatürk University, Department of Nursing Principles, Master's Thesis; 2012.
10. Kaleli İ. Hospital infections. Galenos Magazine. 2003;7(83):17-22.
11. Özinel MA, Bakır M, Çek M, Zorlu F, Güven M, Bozfakioğlu S. Guide to prevention of urinary catheter infections. Turkish Journal of Hospital Infections. 2004;8(1):1-18.
12. Bakır M. Prevention of catheter-related urinary tract infections. Turkish Journal of Hospital Infections. 2004;(8):86-100.
13. Warren JW. Nosocomialurinery tract infections. In: Mandell GL, Bennet JE, Dolin R (eds). Principles and Practice of Infectious Diseases, 4th ed. New York, Churchill Livingstone INC. 1995:2607-2616.
14. Çakar V. Intravascular Catheters and Prevention of Peripheral Venous Catheter-Related Infections. Journal of Education and Research in Nursing. 2008;5(1):24-33.
15. Özer B, Otkun MT, Memiş D, Oktun M. The Nosocomial infections, microorganisms and their antimicrobial susceptibilities and antibiotic consumption in intensive care unit. Turkish Journal of Infection. 2006;20(3):165-170.
16. Akın A, Çoruh AE, Alp E, Canpolat DG. The evaluation of nasocomial infections and antibiotic resistance in anesthesia intensive care unit for five years. Erciyes Med J. 2011;33(1):7-16.
17. Öztürk R, Saltoğlu N, Aygün G. Hospital infections: Prevention and control. 1st Edition. Aksu Publishing, Istanbul. 2008:23-29.
18. Demir E. The Evaluatıon of the nurses workıng at Firat Unıversity Hospital about hospital infections according to their knowledge, attıtudes and behaviors. Firat University, Institute of Health Sciences, Department of Public Health, Master's Thesis, Elazığ, 2013.
19. Diker S. Determination of knowledge levels of nurses working in hospitals in Uşak city center on nosocomial infections. Master's thesis, Institute of Health Sciences, Surgical Diseases Nursing Department, Afyon Kocatepe University, 2003.
20. Günay SH. Determining the knowledge level of nurses about hospital infections. Istanbul: Istanbul University; 1995.
21. Altıok M, Kuyurtar F, Karaçoğlu S, Ersöz G, Erdoğan S. healthcare workers experiences with sharps and needlestick injuries and precautions they took when injuring. Maltepe Üniversitesi Hemşirelik Bilim ve Sanatı Dergisi. 2009;2(3):70-79.
22. Bayındır Y. Legitimate role to play in the perspective of hospital infections and hospital management Turkey. 4th National Sterilization Disinfection Congress (Congress Book). Samsun. 20-24 April 2005, 527-538. Access: 28.11.2020. http://www.das.org.tr/kitaplar/kitap2005/48-05.pdf.
23. İnfal S, Şahin TK. Evaluation of knowledge and attitudes of a university hospital auxiliary staff about hospital infections. Turkish Bulletin of Hygiene and Experimental Biology.2016;73(1):39-48.